The Edwards Plateau Woodland ecoregion contains the central part of the Edwards Plateau north of the highly dissected Balcones Canyonlands (30c). It encompasses the

portion of the Edwards Plateau that receives sufficient rainfall to support woodland in contrast to

Balcones Fault Zone, separating central Texas from the coastal plain. The Balcones Canyonlands

the drier portion of the plateau to the west (30d) that has open juniper woodland and brush. The are highly dissected through the erosion and solution of springs, streams, and rivers working

profile of the hills is rounded due to increased precipitation and chemical weathering. The both above and below ground; percolation through the porous limestone contributes to the

dissection is moderate compared to the higher dissection of the Balcones Canyonlands (30c) to recharge of the Edwards Aquifer. High gradient streams originating from springs in steep-sided

the south. Historically, the Edwards Plateau was a savanna of grasslands with scattered plateau canyons supply water for development on the Texas Blackland Prairies (32) at the eastern base of

live oak, Texas oak, Ashe juniper, and honey mesquite. With fire suppression and grazing, Ashe the escarpment. Ecoregion 30c supports a number of endemic plants and has a higher

juniper and mesquite have spread, reducing the savanna character of the plateau. The grasslands representation of deciduous woodland than elsewhere on the Edwards Plateau (30), with

of Ecoregion 30a are considered a southern extension of the mixed grass prairie, expressed as escarpment black cherry, Texas mountain-laurel, madrone, Lacey oak, bigtooth maple, and

tallgrass or shortgrass dependent upon soil type, moisture availability, and grazing pressure. Carolina basswood. Some relicts of eastern swamp communities, such as baldcypress, American

Grasses include little bluestem, Texas wintergrass, yellow Indiangrass, white tridens, Texas sycamore, and black willow, occur along major streamcourses. It is likely that these trees have

Edwards Plateau Woodland (30a) surrounding Ecoregion 30b. The woody vegetation has geologic foundation of Ecoregion 30d, Cretaceous limestone, is the same as the rest of the

elements of both 30a and the Cross Timbers (29b and 29c), with plateau live oak, honey Edwards Plateau, the shape of the landscape differs from that further east because of the relative

aspect and habitat. Flora normally found in the deserts of West Texas, such as catclaw mimosa mainly through rockfall at the margins of mesas rather than through limestone dissolution.

and soaptree yucca, also occur on dry sites. Ashe juniper and Texas oak are generally absent Canyons break the surface; most streams are intermittent, but perennial streams have the

from the Llano Uplift; they are found mainly on the slopes of the limestone escarpment character of those in the wetter central Edwards Plateau to the east. Although honey mesquite,

surrounding the basin or on limestone inclusions. Grasses include little bluestem, switchgrass,

Ashe juniper, and plateau live oak are still present in Ecoregion 30d, live oak is restricted to

yellow Indiangrass, and silver bluestem. Dome-like granite hills and outcrops contain unusual floodplains. Other arid-land shrubs become more common: lotebush, lechuguilla, sotol, and

plant communities. Although ranching is the major land use, level areas of sandy loam produce redberry juniper. Short grasses, such as buffalograss, tobosa, and black grama become more

The Northern Nueces Alluvial Plains ecoregion differs from much of Ecoregion 31 due to greater precipitation (22-28 in.), numerous streams that flow from the Balcones occurring in spring and fall. Spring rains are the result of frontal activity, while fall precipitation

Canyonlands (30c), transitional vegetation patterns, different mosaic of soils and surficial is usually tropical in origin. Typically, transpiration and evaporation far exceed input from

materials, and land cover that includes more cropland and pasture. Broad Holocene and precipitation precipitation is erratic, with extreme year-to-year moisture variation. Droughts are

Pleistocene-age alluvial fans and other alluvial plain deposits characterize the region. The region common and frequently severe. The vegetation is dominated by drought-tolerant, mostly small-

has a hyperthermic soil temperature regime with aridic ustic and typic ustic soil moisture leaved, and often thorn-laden small trees and shrubs, especially legumes. The most important

regimes. Soils are mostly very deep, moderately fine-textured and medium-textured. Mollisols woody species is honey mesquite. Where conditions are suitable, there is a dense understory of

and Alfisols are typical, with some Inceptisols. General vegetation types include some mesquite-

live oak-bluewood parks in the north, and mesquite-granjeno parks in the south. Some open granjeno, kidneywood, coyotillo, Texas paloverde, anacahuita, and various species of cacti.

grassland with scattered honey mesquite, plateau live oak, and other trees occur. Little bluestem, Xerophytic brush species, such as blackbrush, guajillo, and ceniza, are typical on the rocky,

bristlegrass, and other mid grasses are dominant on deeper soils. Open grassland with scattered Rio Grande. Mid and short grasses are common, including cane bluestem, silver bluestem,

low-growing brush, such as guajillo, blackbrush, elbowbush, and kidneywood, characterize multiflowered false rhodesgrass, sideoats grama, pink pappusgrass, bristlegrasses, lovegrasses,

dominant mid grasses on these soils. Some floodplain forests may have hackberry, plateau live supplemented with hunting leases. Northern bobwhite and white-tailed deer are important game

oak, pecan, and cedar elm, with black willow and eastern cottonwood along the banks. Cropland species. Hunting also occurs for mourning doves, wild turkey, and collared peccary. Cultivated

composed of karstic Edwards Limestone nor physiographically part of Ecoregion 30, Ecoregion section is controlled in part by two large dams, Amistad above Del Rio, and Falcon below

31b contains springs and streams that show some similarities to those of the Edwards Plateau Laredo. The region consists of mostly Holocene alluvium or Holocene and Pleistocene terrace

(30) because they flow over a chalky substrate and likely originate from cool water aquifers deposits, with a mix of ustic to aridic, hyperthermic soils. Some floodplain forests occurred,

beneath the Edwards Plateau. The very presence of perennial streams in such an arid region is especially in the lower portion of the region, with species such as sugar hackberry, cedar elm,

distinctive. Elevations are lower and the climate is warmer than on the Edwards Plateau (30), and Mexican ash. These species are generally more typical downstream in 34f. Riparian forests

and the vegetation, primarily blackbrush and honey mesquite, is more typical of the rest of the have declined as natural floods have been restricted by flood-controlling dams and water

The rolling to nearly level plains of the Northern Blackland Prairie ecoregion are and Paleustolls), and Alfisols (Paleustalfs and Haplustalfs). The region appears more dissected

are mostly fine-textured, dark, calcareous, and productive Vertisols. Historical vegetation was is a more complex mosaic than in 32a, with more post oak woods and pasture. Historical

dominated by little bluestem, big bluestem, yellow Indiangrass, and tall dropseed. In lowlands grassland differences between 32b and 32a are not well known. Although they were likely to be

and more mesic sites, such as on some of the clayey Vertisol soils in the higher precipitation generally similar, 32b may have had some subdominant species more similar to those of the

areas to the northeast, dominant grasses were eastern gamagrass and switchgrass. Also in the Northern Humid Gulf Coastal Prairies (34a). Big bluestem was a likely dominant on the northeast, over loamy Alfisols, were grass communities dominated by Silveanus dropseed, Blackland Prairie Mollisols, and little bluestem-brownseed paspalum prairie often occurred on

Mead's sedge, bluestems, and long-spike tridens. Common forbs included asters, prairie bluet, the Fayette Prairie Alfisols. Similar to Ecoregion 32a, the shrink-swell clays contain gilgai

prairie clovers, and black-eyed susan. Stream bottoms were often wooded with bur oak, microtopography with small knolls and shallow depressions that can influence the composition

been converted to cropland, non-native pasture, and expanding urban uses around Dallas, Waco,

The Floodplains and Low Terraces ecoregion of the Texas Blackland Prairies includes

The Southern Blackland Prairie ecoregion, also known as the Fayette Prairie, has covers primarily the Holocene deposits and not the older, high terraces. The bottomland forests

differences. The Miocene-age Fleming Formation and to the west the Oakville Sandstone have most have been converted to cropland and pasture. The alluvial soils include Vertisols, Mollisols,

similarities to 32a, although there are some geologic, soil, vegetation, and land use contained bur oak, Shumard oak, sugar hackberry, elm, ash, eastern cottonwood, and pecan, but

underlain by interbedded chalks, marls, limestones, and shales of Cretaceous age. Soils than most of 32a, elevations are lower, and there are less extensive areas of cropland. Land cover

slope wash deposits below the escarpment of the Edwards Plateau (30). Although not one of the largest in North America. The river is generally sluggish and its water flow in this

is common, but large areas are used as rangeland. The main crops are corn, cotton, small grains, land is minimal, with mostly grain sorghum, small grains, cotton, and watermelons.

shallower soils. Arizona cottontop, sideoats grama, green sprangletop, and false rhodesgrass are and tobosa. Most of the area is rangeland and large ranches raise beef cattle. Ranching income is

sideoats grama, lovegrass tridens, multiflowered false rhodesgrass, Arizona cottontop, plains gravelly ridges and uplands. The brush communities also tend to grade into desert scrub near the

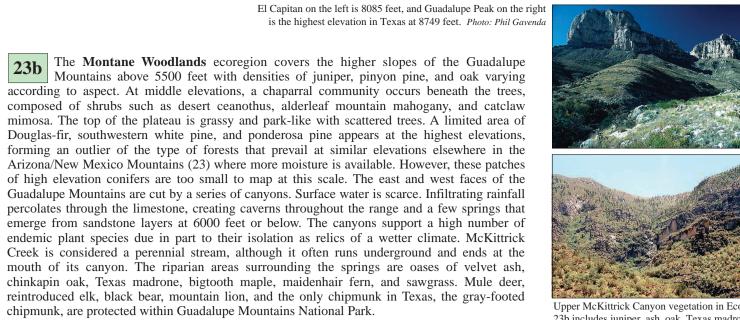
mesquite, post oak, blackjack oak, cedar elm, and some black hickory present depending on lack of precipitation. The profiles of the hills are sharp, not rounded, because erosion occurs such as juniper and honey mesquite have

The Semiarid Edwards Bajada ecoregion is composed primarily of alluvial fan and the seeds are eaten by birds. Photo: R.E. Rosiere,

The Chihuahuan Desert Slopes of the Guadalupe Mountains in Texas form the leading edge of a giant uplifted Permian reef created from the accumulated remains of algae,

The Montane Woodlands ecoregion covers the higher slopes of the Guadalupe Mountains above 5500 feet with densities of juniper, pinyon pine, and oak varying sponges, and marine bivalves. The 2000 foot high, white cliff face of the southern Guadalupe according to aspect. At middle elevations, a chaparral community occurs beneath the trees, Mountains dominates the landscape of the northern Trans-Pecos of Texas. The lower slopes of composed of shrubs such as desert ceanothus, alderleaf mountain mahogany, and catclaw the mountains, composed of eroded limestone, shale, and sandstone, represent a continuation of mimosa. The top of the plateau is grassy and park-like with scattered trees. A limited area of the Chihuahuan Desert ecosystem; soils and vegetation in much of Ecoregion 23a are similar to Douglas-fir, southwestern white pine, and ponderosa pine appears at the highest elevations, those in the Low Mountains and Bajadas (24c) of the Chihuahuan Deserts ecoregion (24). There forming an outlier of the type of forests that prevail at similar elevations elsewhere in the is some evidence that the lower Guadalupe Mountains were once grasslands overgrazed in the Arizona/New Mexico Mountains (23) where more moisture is available. However, these patches late 19th century and subsequently invaded by desert shrubs. Yucca, sotol, lechuguilla, ocotillo, of high elevation conifers are too small to map at this scale. The east and west faces of the and cacti now dominate the rocky slopes below 5500 feet. These shrub species are sometimes Guadalupe Mountains are cut by a series of canyons. Surface water is scarce. Infiltrating rainfall called succulent desert shrubs to distinguish them from shrubs such as creosotebush typically percolates through the limestone, creating caverns throughout the range and a few springs that found in the drier Chihuahuan Basins and Playas (24a). Grasslands persist near alluvial fans and emerge from sandstone layers at 6000 feet or below. The canyons support a high number of on gentle slopes with deeper, sandstone-derived soils. Water is scarce; the few streams that endemic plant species due in part to their isolation as relics of a wetter climate. McKittrick originate from springs at higher elevations do not persist beyond the mouths of major canyons. Creek is considered a perennial stream, although it often runs underground and ends at the Several lizard species that are adapted to the exposed, sun-baked landscape of West Texas are mouth of its canyon. The riparian areas surrounding the springs are oases of velvet ash, indicative of the succulent desert shrubland: the round-tailed horned lizard, the checkered chinkapin oak, Texas madrone, bigtooth maple, maidenhair fern, and sawgrass. Mule deer,

chipmunk, are protected within Guadalupe Mountains National Park.



and bigtooth maple, with some ponderosa pine at higher elevations. Photo: National Park Service

## 24. Chihuahuan Deserts

whiptail, and the greater earless lizard.

25. High Plains

growing in these environments, such as creosotebush, tarbush, fourwing saltbush, blackbrush, gyp grama, and alkali sacaton, must withstand large diurnal ranges in temperature, low available moisture, and an extremely high evapotranspiration rate. The alien saltcedar and common reed Dell City, where irrigation water is available to produce cotton, pecans, alfalfa, tomatoes,

Chihuahuan Basins and Playas (24a), such as elevated basins between mountain ranges, low refuge for larger ungulates, such as mule deer, desert bighorn sheep, and reintroduced elk. mountain benches and plateau tops, and north-facing high mountain slopes. Grasslands in West Texas were once more widespread, but grazing pressure in the late 19th and early 20th centuries was unsustainable, and desert shrubs invaded where the grass cover became fragmented. In grassland areas with lower rainfall, areal coverage of grasses may be sparse, 10% or less. Typical grasses are black, blue, and sideoats grama, bush muhly, tobosa, beargrass, and galleta, with scattered creosotebush and cholla cactus. Effective management strategies for grasslands take into account their fragile and erosive nature.

southward along the Rio Grande; and Tertiary-age volcanic rocks in the Chisos and Davis

to agricultural conversion to modern farming practices as well as intensive grazing.

In cultivated areas, corn, winter wheat, and grain sorghum are the principal crops.

The Canadian/Cimarron High Plains ecoregion includes that portion of the Llano 25e The Canadian/Chilari on Fight Flams ecologism motion of Estacado that lies north of the Canadian River in the Texas Panhandle. Winters are more

The **Llano Estacado** ecoregion, translated as the "Staked Plain", is an elevated plain surrounded by escarpments on three sides. Geologically, the Llano Estacado began as an

apron of Miocene-Pliocene sediments (Ogallala Formation) eroded from the eastern Rocky

Mountains that was eventually covered by Pleistocene wind-borne sand and silt. Several caliche

The Chihuahuan Basins and Playas ecoregion includes alluvial fans, internally drained Mountains. The mountainous terrain has shallow soil, exposed bedrock, and coarse rocky basins, and river valleys below 3500 feet. The major Chihuahuan basins in Ecoregion substrates. Alluvial fans of rubble, sand, and gravel build at the base of the mountains and often 24a, such as the Hueco, Salt, and Presidio basins, formed during the Basin and Range tectonism coalesce to form bajadas. Vegetation includes mostly desert shrubs, such as sotol, lechuguilla, when the Earth's crust stretched and fault collapse resulted in sediment-filled basins. These low yucca, ocotillo, lotebush, tarbush, and pricklypear, with a sparse intervening cover of black elevation areas represent the hottest and most arid habitats in Texas, with less than 12 inches of grama and other grasses. At higher elevations, there may be scattered one-seeded juniper and precipitation per year. Precipitation amounts are highest in July, August, and September, and pinyon pine. Strips of gray oak, velvet ash, and little walnut etch the patterns of intermittent and winter precipitation is relatively sparse. The playas and basin floors have saline or alkaline soils ephemeral drainages, and oaks may spread up north-facing slopes from the riparian zones. The and areas of salt flats, dunes, and windblown sand. The typical desert shrubs and grasses varied habitats provide cover for mule deer, bobcat, collared peccary, and Montezuma quail. The Chihuahuan Montane Woodlands ecoregion comprises the higher elevation

mountainous areas above 5000 feet, mainly in the Chisos, Davis, Glass, and Apache Mountains. Increased precipitation in the mountains supports woodland areas except on sunny, have invaded riparian areas. Land use, particularly grazing, is limited in desert areas due to exposed slopes that may have grass and chaparral only. Springs are few even at high elevations sparse vegetation and lack of water. However, limited areas of agriculture exist near El Paso and and mid-elevation streams may flow only during heavy rains. Oaks, junipers, and pinyon pines predominate on all these mountain ranges. Ponderosa pine and some relict Douglas-fir grow at the highest elevations in the Chisos Mountains. Higher elevation sites in the Davis Mountains The Chihuahuan Desert Grasslands occur in areas of fine-textured soils, such as silts also support ponderosa pine, southwestern white pine, and whiteleaf oak forests. In these ranges, and clays, that have a higher water retention capacity than coarse-textured, rocky soil. trees sometimes grow with a grassy understory, or with a brush cover of bigtooth maple, The grasslands occur in areas of somewhat higher annual precipitation (10 to 18 inches) than the madrone, little walnut, oak chaparral, and grapevines. The higher mountainous areas are a major

The Stockton Plateau ecoregion is similar geologically to the Edwards Plateau (30), but it differs ecologically. Geologically, it is a continuation of the Cretaceous-age limestone that forms the Edwards Plateau, but it is located west of the Pecos River in the dry climatic conditions of West Texas. The character of Ecoregion 24e is transitional to the arid grassland and desert shrub habitats of the Chihuahuan Desert to the west. Its mesa topography is more sharply defined than the rounded profiles of hills in the Edwards Plateau due to a lack of precipitation and associated chemical weathering. The mesa tops are sparsely covered by honey The Low Mountains and Bajadas ecoregion includes disjunct areas scattered across West Texas that have a mixed geology: Permian-age sandstone, limestone, and shale in growth form, replace the plateau live oak that is common on the Edwards Plateau. The lower the Apache and Delaware Mountains; Cretaceous-age limestone on the Stockton Plateau and elevations on the Stockton Plateau are covered with Chihuahuan Desert shrubs and grama grasses.



spiders, snails, lizards, and some fruits and seeds

Montane Woodlands (24d), with ponderosa pine, Douglas-fir, Arizona pine, or southwestern white

Irrigated agriculture is common on the Llano Estacado (25i). Northern portions have experienced significant groundwater declines in the Ogallala Aquifer, while levels in southern areas are variable. Photo: USGS The Rolling Sand Plains expand northward from the lip of the Canadian River trough, ponds or playas. The Llano Estacado was once covered with shortgrass prairie, composed of and they are topographically expressed as flat sandy plains or rolling dunes. In northern buffalograss, blue and sideoats grama, and little bluestem. An estimated 7 million bison once Texas, the vegetative cover of the Rolling Sand Plains is transitional between the Shinnery populated the southern High Plains. They were the most prominent elements of a prairie Sands (25j) to the south and the sandsage prairies of Oklahoma and Kansas. Havard shin oak, ecosystem that no longer functions as an interdependent web of bison, black-tailed prairie dog, the characteristic shrub cover of the Shinnery Sands, still grows in the Texas portion of black-footed ferret, snake, ferruginous hawk, coyote, swift fox, deer, pronghorn, mountain lion, and sand sagebrush perform the same important function of stabilizing sandy areas subject to cotton, corn, and wheat under dryland agriculture or irrigated with water pumped from the wind erosion. The goal of both agricultural and grazing management is to keep enough Ogallala Aquifer. In the era before irrigation, agriculture was not sustainable during drought vegetative cover on the land surface to minimize wind erosion. The sandsage association cycles; the Llano Estacado formed the core of the Dust Bowl during the drought years of the includes grasses such as big sandreed, little bluestem, sand dropseed, and sand bluestem. Lesser 1930's. The capacity of the Ogallala Aquifer is limited, particularly under drought conditions, prairie-chickens use both shin oak and sandsage prairie habitats, but are presently imperiled due emphasizing the need for enhancement and expansion of ongoing water conservation practices

The **Shinnery Sands** ecoregion is named for the Havard oak brush that stablizes sandy areas subject to wind erosion. The disjunct areas include sand hills and dunes as well as severe than on the Llano Estacado (25i); the increased snow accumulation delays summer flat sandy recharge areas. The largest area, at the southwestern edge of the Llano Estacado, is drought conditions because the snowmelt saturates the ground in the spring season. Although the composed of sands most likely blown out of the Pecos River Basin against the western topography of 25e is just as flat as the rest of the Llano Estacado, the northern portion has fewer escarpment of the Llano Estacado. While sand sagebrush and prairie grasses such as sand playas, and it is more deeply dissected by stream channels. There is also more grazing land in dropseed, sand bluestem, and big sandreed may create a continuous plant cover in portions of Ecoregion 25e; the rougher terrain near the stream incisions tends to be grazed rather than tilled. Ecoregion 25j, the shrub and forb cover may be sparse in dune areas. The shinnery sands are habitat for the lesser prairie-chicken, a species that is in serious decline. The shrubs offer cover and shade for nesting, and shin oak acorns are a staple food source. The decline of the prairiechicken is linked to the conversion of shinnery to other uses.

The **Arid Llano Estacado** ecoregion is drier than the main portion of the Llano Estacado (25i) to the north. Its climate is transitional to the arid Trans-Pecos region to horizons developed in the Ogallala sediments, including a hardened caprock caliche in the the southwest (Ecoregion 24). It has somewhat more broken topography and fewer playas than uppermost layer. The Pecos River captured the headwater streams of rivers that once ran across the plain (25i) to the north. There is also less winter precipitation and snow cover to provide the plain from the Rockies, isolating the Llano Estacado and truncating the drainage areas of the lasting moisture over the summer months. The arid conditions are reflected in the land use, Red, Brazos, and Colorado rivers of Texas. As a result, the dry plain, cut off from a mountain which is dominated by livestock grazing and more recently irrigated peanut production. Oil and surface water source and with little slope to induce runoff, has a very low drainage density. gas production activities are widespread.



food source for many predators, and their burrows provide homes for many other animal species, such as black-footed ferrets, burrowing

owls, rabbits, and snakes. Photo: TPWD

# Instead, the smooth surface of the plain holds seasonal rainfall in myriads of small intermittent

26. Southwestern Tablelands The Canadian/Cimmaron Breaks ecoregion is a broad erosional incision between the High Plains (25) and the Central Great Plains (27). During the Pleistocene, the Canadian

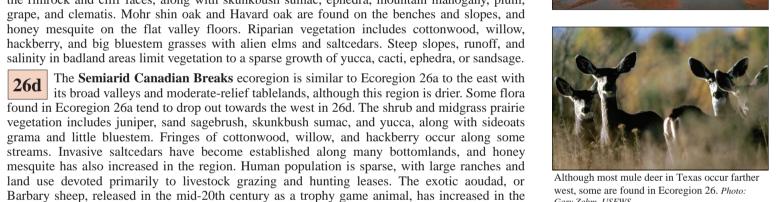
The Caprock Canyons, Badlands, and Breaks ecoregion covers the broken country extending eastward from the eroded edge of the High Plains (25). The escarpment at the River carried much more water than it does today, in draining the meltwater from glaciers in the eastern edge of the Llano Estacado (25i) exposes Ogallala Formation sediments, underlying Rocky Mountains to the west. The river's erosional force was great enough to cause the multicolored Triassic shales, mudstones, and sandstones, and Permian red beds with white headward erosion of the edge of the High Plains. The dissolution of underlying salt beds and gypsum deposits that form the plains to the east. The maximum relief along the escarpment is subsequent collapse of overlying rocks helped to create the deep trench of the Canadian River. 1100 feet; the combination of topography and climate in Ecoregion 26c creates thunderstorms Erosion has not penetrated deeply enough in the Texas portion of this region, however, to and tornadoes in the spring and early summer. Along the escarpments, redberry junipers grow on expose the Permian red beds that are prominent in the Cimarron Breaks to the north and east. the rimrock and cliff faces, along with skunkbush sumac, ephedra, mountain mahogany, plum,

The primary surficial deposit is the Ogallala Formation. The Flat Tablelands and Valleys ecoregion includes islands of level land between the prominent buttes, badlands, and escarpments of the tablelands. Geologically, the surficial composition of these flat areas may be undissected Triassic or Permian red beds, or (in western portions) the Ogallala caprock that is found on the Llano Estacado (25i) to the west. The soils are predominately fine sandy loams or silt loams; as a result, most of Ecoregion 26b has been tilled to produce cotton, sorghum, and wheat. There is a trend toward desertification in found in Ecoregion 26a tend to drop out towards the west in 26d. The shrub and midgrass prairie Ecoregion 26 which is more subtle than that in the Chihuahuan Desert country of West Texas vegetation includes juniper, sand sagebrush, skunkbush sumac, and yucca, along with sideoats (24). Fragments of remaining native prairie are composed of mid-height grasses, such as grama and little bluestem. Fringes of cottonwood, willow, and hackberry occur along some sideoats grama and blue grama, typical of a wetter climate. Where the land has been intensively streams. Invasive saltcedars have become established along many bottomlands, and honey grazed, short grasses such as buffalograss predominate, and invading cacti and honey mesquite mesquite has also increased in the region. Human population is sparse, with large ranches and are common. Saltcedars are replacing native vegetation in riparian areas.

### Saline soils are common along the Salt Fork of the Brazos River and on nearby low tablelands

grape, and clematis. Mohr shin oak and Havard oak are found on the benches and slopes, and honey mesquite on the flat valley floors. Riparian vegetation includes cottonwood, willow, hackberry, and big bluestem grasses with alien elms and saltcedars. Steep slopes, runoff, and salinity in badland areas limit vegetation to a sparse growth of yucca, cacti, ephedra, or sandsage. The Semiarid Canadian Breaks ecoregion is similar to Ecoregion 26a to the east with its broad valleys and moderate-relief tablelands, although this region is drier. Some flora

breaks and competes with the native mule deer for browse.



### commonly called the "brush country". Three centuries of grazing, suppression of fire, and droughts have contributed to the spread of brush and the decrease of grasses. Soils include hyperthermic Alfisols, Aridisols, Mollisols, and Vertisols. They are varied and complex, highly alkaline to slightly acidic, ranging from deep sands to clays and clay loams. Caliche

27. Central Great Plains The broken tablelands of Ecoregion 26c flatten out to form the gently rolling **Red**Prairie ecoregion. Erosion by the Brazos and Colorado rivers has removed the prairie ecoregion. Erosion by the Brazos and Colorado rivers has removed the mixed with the grasses. Riparian vegetation includes cottonwood, hackberry, cedar elm, pecan, overlying Cretaceous limestones to expose the Permian sedimentary rocks. The Central Great and little walnut. In contrast to land use practices in Ecoregion 27h, the Broken Red Plains are Plains ecoregions form a shallow trough between the High Plains (25) to the west and the more used mainly for grazing. rugged topography of the Cross Timbers (29) to the east and Edwards Plateau (30) to the south. rugged topography of the Cross Timbers (29) to the east and Edwards Plateau (30) to the south.

Precipitation amounts are considerably greater than on the High Plains, although they are not sandy limestones, and mudstone. The Limestone Plains are covered by mixed grass high enough to support forest vegetation. Prairie type may be midgrass or shortgrass dependent upon soil type, moisture availability and grazing pressure. Typical grasses include little

more shrub-covered, although the prevalence of honey mesquite may be the result of grazing limestone-based ecoregions in Texas (such as 29d, 29e, 30a), land use is dominated by grazing pressure. The line of 30 inches annual precipitation (or about the 98th meridian) marks the rather than cultivated agriculture. A minor amount of wheat or sorghum may be grown in deeper eastern limit of the distribution of mesquite and the eastern boundary of Ecoregion 27i. As in alluvial soils. Ecoregion 27h, the prairie type is transitional between tallgrass and shortgrass growth

# Short to tall, scattered to dense grasslands were once typical of Ecoregion 27, with less mesquite than today. Populations of bison, pronghorn, plains gray

prairie of little bluestem, yellow Indiangrass, and buffalograss, with scattered honey mesquite. However, upland soils are often thin, rocky, and droughty in the vicinity of limestone outcrops. bluestem, Texas wintergrass, white tridens, Texas cupgrass, sideoats grama, and curlymesquite.

Drier (or eroded) areas support desert shrubs such as lotebush, agarita, tree cholla, and ephedra. The Central Great Plains (27) are typically treeless except in riparian areas, but at the southern The soils of the Broken Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains (27b). However, the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to that on the Red Plains ecoregion are red clay and sand, similar to the Red Plains ecoregion are red clay and sand, similar to the Red Plains ecoregion are red clay and sand, similar to the Red Plains ecoregion are red clay and sand, similar to the Red Plains ecoregion are red clay and sand, similar to the Red Plains ecoregion are red clay and sand, similar to the Red Plains ecoregion are red clay and sand, similar to the Red Plains ecoregion are red clay and sand, similar to the Red Plains ecoregion are red clay and sand, similar to the Red Plains ecoregion are red clay and sand, similar to the Red Plains ecoregion are red clay and sand, similar to the Red Plains ecoregion are red clay and sand, similar to the Red Plains the Red Prairie (27h). However, the topography of Ecoregion 27i is more irregular and the live oak-mesquite-juniper woodland of the adjacent Edwards Plateau (30). As in some other

> Riparian vegetation can include hackberry, cottonwood, elms, and willows. Tree density is sometimes greater to the east near the Cross Timbers (29), as shown here along the Clear Fork of the Brazos River near Ft. Griffin.





### 29. Cross Timbers

30. Edwards Plateau

cupgrass, sideoats grama, seep mully, and common curlymesquite.

31. Southern Texas Plains

bobwhite, and mourning dove are an important source of income.

and vegetables. Most cropland areas are irrigated. Hunting leases for white-tailed deer, northern

31c Covering a large portion of the Southern Texas Plains, the Texas-Tamaulipan

of soils. This South Texas region owes its diversity to the convergence of the Chihuahuan Desert

to the west, the Tamaulipan thornscrub and subtropical woodlands along the Rio Grande to the

south, and coastal grasslands to the east. Composed of mostly gently rolling or irregular plains,

the region is cut by arroyos and streams, and covered with low-growing vegetation. The thorn

woodland and thorn shrubland vegetation is distinctive, and these Rio Grande Plains are

32. Texas Blackland Prairies

**Thornscrub** ecoregion encompasses a mosaic of vegetation assemblages and a variety

wheat, sorghum, and peaches.

between the Grand Prairie (29d) and Texas Blackland Prairies (32) in eastern Texas. The soils Prairie, creating an overlap in Great Plains and eastern forest species. Present land uses include are mainly red and yellow sands that have been leached of nutrients. Post oaks and blackjack grazing on ridges with shallow soils and farming of corn, grain sorghum, and wheat on the oaks have adapted to life in sandy soils and they dominate the overstory, with scattered honey deeper soils on the flats. mesquite and grasses, such as little bluestem and threeawn, growing beneath them. Although the rural land use is predominantly cattle grazing, there is some farming for peanuts, grain sorghum, pecans, peaches, and vegetables. Extensive urban development also occurs within this region. The Western Cross Timbers ecoregion covers the wooded areas west of the Grand

The Western Cross Timbers ecoregion covers the wooded areas west of the Grand

Edwards Plateau (30). The Glen Rose Formation has alternating layers of limestone, chert, and

beds. Deeper soils in the eastern part of this ecoregion support a dairy industry, pastureland, and Indiangrass, silver bluestem, Texas wintergrass, tall dropseed, sideoats grama, and common cultivation of forage sorghum, silage, corn, and peanuts.

to the Northern Blackland Prairie (32a), the limestone of the Grand Prairie is more resistant to included on some maps of the Cross Timbers, because it does not support the typical oak weathering, which gives the topography a rougher appearance. Meandering streams deeply woodland of the sandstone-based territory surrounding it. The topography of Ecoregion 29f is incise the limestone surface. The original vegetation was tallgrass prairie in the upland areas and also somewhat different from that of the Western Cross Timbers (29c) as it contains low elm, pecan, and hackberry in riparian areas where deeper soils have developed in floodplain mountains rather than alternating ridges and shallow basins. The limestone substrate is apparent deposits or where the underlying clays have been exposed by limestone erosion. The invasive in the vegetation cover, which has more plateau live oak, honey mesquite, and pure Ashe juniper species Ashe juniper and, to a lesser extent, honey mesquite have increased since settlement. woodland than in other surrounding Cross Timbers areas. The juniper woodlands are particularly Grand Prairie grasses include big bluestem, yellow Indiangrass, little bluestem, hairy grama, dense. It is presumed that before widespread fire suppression, the area was less wooded and (29) meets Ecoregions 30 and 32. Photo: Clarence

The Llano Uplift ecoregion is actually a basin; in some places, it is 1000 feet below the

batholith) that is exposed in the basin, granite that has been dated at one billion years old.

Upland soils are shallow, reddish brown, stony, sandy loams over granite, gneiss, and schist with

level of the surrounding limestone escarpment. It gets its name from the granitic mass

deeper sandy loams in the valleys. Soils tend to be acidic in contrast to the alkaline soils of the

The Eastern Cross Timbers ecoregion covers a more confined area than the Western Cross Timbers (29c). The ecoregion occurs on sandy substrates (Woodbine Sand) lying such as black-tailed jackrabbit and the seissortail flycatcher, range farther east through the Grand Cross Timbers (29c). The ecoregion occurs on sandy substrates (Woodbine Sand) lying such as black-tailed jackrabbit and the scissortail flycatcher, range farther east through the Grand

Mesas alternate with broad intervening valleys in the stairstep topography of the Limestone Cut Plain. Ecoregion 29e is underlain by Lower Cretaceous limestones, including the Glen Rose Formation and Walnut Clay, that are older than the limestone of the Prairie (29d) on sandstone and shale beds. The landscape has cuesta topography marl that erode differentially and generally more easily than the Edwards Limestone. The effects consisting of sandstone ridges with a gentle dip slope on one side and a steeper scarp on the of increased precipitation and runoff are also apparent in the increased erosion and dissolution of other. The soils are mostly fine sandy loams with clay subsoils that retain water. As in the the limestone layer. The Limestone Cut Plain has flatter topography, lower drainage density, and Eastern Cross Timbers (29b), the dominant trees are post oak and blackjack oak with an a more open woodland character than the Balcones Canyonlands (30c). The vegetation of understory of greenbriar, little bluestem, and purpletop grasses. Some researchers contend that Ecoregion 29e is similar to that of the Balcones Canyonlands, but less diverse: post oak, white these woodland areas would be savanna-like if they experienced fire, although one early account shin oak, cedar elm, Texas ash, plateau live oak, and bur oak are prevalent. Although the described the Cross Timbers as "an immense natural hedge" or belt of thick impenetrable forest. grasslands of the Limestone Cut Plain are a mix of tall, mid, and short grasses, some consider it It is likely that there were more prairie openings between the belts of forest. The area has a long a westernmost extension of the tallgrass prairie, which distinguishes this ecoregion from the history of coal, oil, and natural gas production from the Pennsylvanian sandstone/limestone/shale Edwards Plateau Woodland (30a). Grasses include big bluestem, little bluestem, yellow

The **Grand Prairie** is an undulating plain underlain by Lower Cretaceous limestones with interbedded marl and clay. Although the vegetation of the Grand Prairie is similar (29c) that has Pennsylvanian or Cretaceous limestone substrate. This area is not

persisted as relics of moister, cooler climates following the Pleistocene glacial epoch. Toward the

west, the vegetation changes gradually as the climate becomes more arid. Plateau live oak

woodland is eventually restricted to north and east facing slopes and floodplains, and dry slopes

The Semiarid Edwards Plateau ecoregion lies west of the 100th meridian, where

common in the west and northwest portions of Ecoregion 30d as the climate becomes more arid.

diversions. Brushy species from adjacent dry uplands occur at the margins, such as honey

mesquite, huisache, blackbrush, and lotebush, with some grasses such as multiflowered false

rhodesgrass, sacaton, cottontop, and plains bristlegrass. Wetter areas near the river may have

black willow, black mimosa, common and giant reed, and hydrophytes such as cattails,

bulrushes, and sedges. Many of the wider alluvial areas of the floodplain and terraces are now in

cropland, mostly with cotton, grain sorghum, and cool-season vegetables. The arid or semi-arid

climate of the Rio Grande Basin, the over-allocation of actual water, and the difficulties of bi-

national management contribute to serious water resource, environmental, and economic issues.

Water withdrawals and pollution from agricultural, urban, and industrial sources have degraded

water quality. Salinity, nutrients, fecal coliform bacteria, heavy metals, and toxic chemicals are

only the broadest floodplains, i.e., those of the Trinity, Brazos, and Colorado rivers. It

concerns for river uses such as irrigation and drinking water.

precipitation amounts are too low to support closed canopy forest. Although the

are covered with open shrublands of juniper, sumac, sotol, acacia, honey mesquite, and ceniza.

The endangered golden-cheeked warbler depends on habitat of mature Ashe

Clear waters and adequate flows make streams and reservoir

The Texas range of collared peccary is mostly within Ecoregions 31 and 24.

The Rio Grande Floodplain and Terraces are relatively narrow in Texas, but this feet high. The flowers provide nectar for insects,

region is an important natural and cultural feature of the state. Draining more than its fruit is eaten by deer and collared peccary, and

The ocelot is a neotropical cat that once ranged over the south

of disappearing from the state. Photo: Tom Smyli

Pale purple coneflower is a prairie wildflower known for medicinal

Houston Black, recognized as the State Soil of Texas, is a Vertisol development

on the Texas Blackland Prairie. These clayey soils shrink when dry and swell

when wet, and formed in calcareous clays and marls of Cretaceous age. The

Sagebrush, Sand

prime farmland soils are important agriculturally, supporting crops of gra

sorghum, cotton, corn, small grains, and forage grasses. Photo: NR

uses. Its nectar is used by butterflies and its seeds are a food source

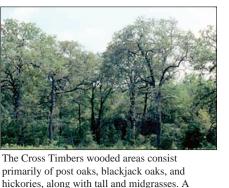
part of Texas. It occurs now only in a few small patches of

emaining habitat near the lower Rio Grande and is on the verge

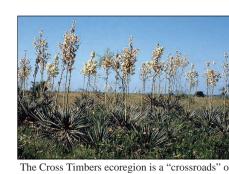
fishing and other recreational activities. Photo: USAC

Prickly pear is an important part of their diet. Photo: TPWD

juniper, plus a mix of oaks and other hardwoods. Photo: Earl Nottingham, TP



denser woody understory forms in the absence of fire. Photo: R.E. Rosiere, Tarleton State University



landscapes and vegetation types with its prairies endemic to a six-county area of central Texas where the southern part of the Cross Timbers

Plateau live oaks are found in the woodlands and

31. Rangeland is the dominant land use, although

ome cropland is scattered throughout the region.

improved pasture, rangeland, and some cropland.

in a few areas unique bogs occur.

northern bobwhite, eastern fox squirrel, and eastern gray squirrel.

mostly fine-textured: clay, clay loam, or sandy clay loam. Within the region, there are some differences from the higher Lissie Formation to the lower Beaumont Formation, both of Pleistocene age. The Lissie Formation has lighter colored soils, mostly Alfisols with sandy clay loam surface texture, while darker, clayey soils associated with Vertisols are more typical of the Beaumont Formation. Annual precipitation varies from 37 inches in the southwest portion to 58 inches in the northeast, with a summer maximum.

34. Western Gulf Coastal Plain

33. East Central Texas Plains

The landscapes of the Northern Post Oak Savanna ecoregion are generally more level

woodland is composed mostly of post oak, blackjack oak, eastern redcedar, and black hickory.

Prairie openings contained little bluestem and other grasses and forbs. The land cover currently

has more improved pasture and less post oak woods and forest than 33b. Some coniferous trees

occur, especially on the transitional boundary with Ecoregion 35a. Loblolly pine has been

planted in several areas. Typical wildlife species include white-tailed deer, eastern wild turkey,

sediments. Sand exposures within these Tertiary deposits have a distinctive sandyland flora, and

region have more dissected and irregular topography than Ecoregion 33a to the north. The soils too small to map at this scale.

and gently rolling compared to the more dissected and irregular topography of much of

Setaria increase in importance in Ecoregion 34b compared to 34a. Invasive species such as of this region and Ecoregion 34h. honey mesquite and huisache are a concern. Within the region, there are some differences from the higher Lissie Formation to the lower Beaumont Formation, both of Pleistocene age. The Lissie Formation has lighter colored soils, mostly Alfisols with sandy clay loam surface texture, while darker, clayey Vertisols are more typical of the Beaumont Formation. Almost all of the coastal prairies have been converted to other land uses: cropland, pasture, or urban and industrial.

The Coastal Sand Plain ecoregion provides a distinct break in both vegetation and surficial materials from the fine-textured soil grasslands of Ecoregion 34b to the north. This sand sheet landscape consists of active and (mostly) stabilized sand dune deposits with lesser amounts of silt sheet deposits (silt and fine sand) to the north. This depositional plain is characterized by a closed internal drainage system with only occasional discontinuous drainage remnants due to sand movement. Closed depressions pond water in response to seasonal and tropical storm precipitation. Soils developed on these parent sediments are Entisols and Alfisols with thick sand surfaces. The dominant grasses on the coastal sand ridges and islands extend inland covering parts of the sand plain. Vegetation is mostly mid and tall grasses such as seacoast bluestem, switchgrass, gulfdune paspalum, fringeleaf paspalum, sandbur, purple threeawn, pricklypear, and catclaw with an overstory of southern live oak and honey mesquite trees. The potholes have a variety of bulrushes and sedges. Most of the Coastal Sand Plain has

pasture grasses. The region has little cropland compared to Ecoregion 34b. The Lower Rio Grande Valley ecoregion once supported dense, diverse grassland and shrub communities and low woodlands. However, mesquite, granjeno, and a variety of brush and shrub species invaded the landscape. Now, it is almost all in cropland, pasture, and urban land cover. The region is underlain by a mix of Quaternary clays and sands with some Miocene-age sediments of the Goliad Formation at the western edge. Mollisols are extensive, and the soils are deep, mostly clay loams and sandy clay loams. The freeze-free growing season is often over 320 days compared to 250-260 days along the northern Texas coastal area of Ecoregion 34a. Along with Ecoregion 34f, the Lower Rio Grande Valley contains important nesting grounds for the white-winged dove, a favored hunting species in southern Texas.

The Lower Rio Grande Alluvial Floodplain ecoregion includes the Holocene-age alluvial sands and clays of the Rio Grande floodplain that are now almost completely in blue crab harvest is also smaller than the other two coastal regions to the north. Pink shrimp cropland or urban land cover. The soils, mostly Vertisols and Mollisols, are deep, loamy and make up an important part of the commercial harvest while white shrimp are more abundant to The endangered hawksbill sea turtle is an clayey, and tend to be finer-textured than in Ecoregion 34e to the north. Some Entisols and the north in 34g. The historically highly productive commercial fisheries have now given way to occasional visitor to the Texas coast. Small Inceptisols occur near the river. The floodplain ridges once had abundant palm trees, and early an important sport fishery for species such as red drum, black drum, and spotted sea trout. Spanish explorers called the river "Rio de las Palmas." Most large palm trees and floodplain

Marshes are less extensive on the southern coast. A few stands of black mangrove tidal shrub forests had been cleared by the early 1900's. A few small pieces of unique floodplain forests occur in this region. remain, including Texas ebony, Texas palmetto, and sugar hackberry-cedar elm floodplain

some Vertisols, and Mollisols. Generally, there are fewer Vertisols compared to the Northern northern floodplains tend to have more forested land cover, while in the south the Brazos and Blackland Prairie ecoregion (32a) to the west. Upland Alfisol prairies were dominated by little Colorado River floodplains are characterized by more cropland and pasture. bluestem and yellow Indiangrass and contained a different mix of grasses and forbs than the dark, clayey, more calcareous Vertisols of Ecoregion 32a. Since the 1830's, settlement clustered along the Old San Antonio Road (State Highway 21 in the south, Old San Antonio Road in the north) within this narrow belt of prairie land. Currently, land cover is a mosaic of woodland,

The endangered Houston toad is associated with deep, sandy soils in Southern Post Oak Savanna ecoregion (33b). The largest re population occurs in the Bastrop Lost Pines (33e). Photo: Rober

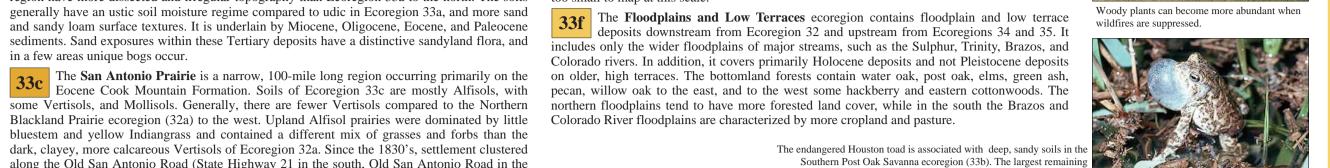
Post oak woods and savanna characterize the transitional nature of Ecoregion 33

between forests to the east and grasslands to the west. Photo: Craig McMahon. TPWD

The small, disjunct areas of the Northern Prairie Outliers ecoregion have a blend of

Indiangrass, and tall dropseed. Current land cover is mostly pasture, with some cropland.

characteristics from Ecoregions 32 and 33. The northern two outliers, north of the



Ecoregion 33b to the south. It is underlain by mostly Ecoene and Paleocene-age formations with

Sulphur River, occur on Cretaceous sediments, while south of the river, Paleocene and Ecoene

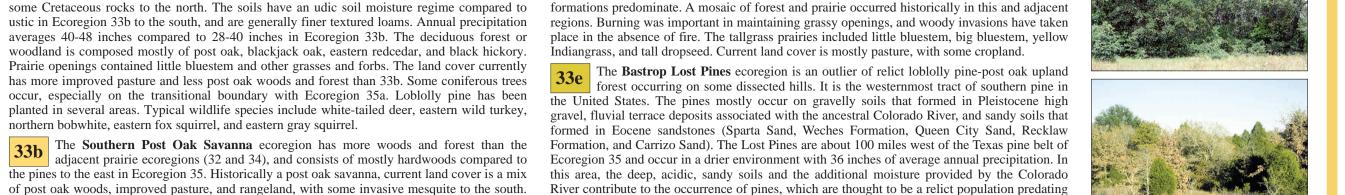
Ouaternary-age deltaic sands, silts, and clays underlie much of the **Northern Humid** forests. It is the most subtropical climate of Texas, but hard freezes occasionally occur, affecting Gulf Coastal Prairies on this gently sloping coastal plain. The original vegetation was plants and animals that are at the northern limit of their range. Crops include cotton, citrus, grain plants and animals that are at the northern limit of their range. Crops include cotton, citrus, grain mostly grasslands with a few clusters of oaks, known as oak mottes or maritime woodlands. sorghum, sugar cane, vegetables, and melons. The Rio Grande's water is mostly diverted from its Little bluestem, yellow Indiangrass, brownseed paspalum, gulf muhly, and switchgrass were the channel for irrigation and urban use, and little or no flow reaches the Gulf of Mexico. Both the dominant grassland species, with some similarities to the grasslands of Ecoregion 32. Almost all Central and Mississippi flyways funnel through the southern tip of Texas and many species of of the coastal prairies have been converted to cropland, rangeland, pasture, or urban land uses. birds reach their extreme northernmost range in this region. In addition, subtropical, temperate, The exotic Chinese tallow tree and Chinese privet have invaded large areas in this region. Some coastal, and desert influences converge here, allowing for great species diversity. Nearly 500 bird loblolly pine occurs in the northern part of the region in the transition to Ecoregion 35. Soils are species, including neotropical migratory birds, shorebirds, raptors, and waterfowl, can be found here. The **Texas-Louisiana Coastal Marshes** region is distinguished from Ecoregions 34h and 34i by its extensive freshwater and saltwater coastal marshes, lack of barrier islands

and fewer bays, and its wetter, more humid climate. Annual precipitation is 48 to 54 inches in Texas and up to 60 inches in Louisiana. There are many rivers, lakes, bayous, tidal channels, and canals. The streams and rivers that supply nutrients and sediments to this region are primarily from the humid pine belt of Ecoregion 35. Extensive cordgrass marshes occur. The estuarine and The Southern Subhumid Gulf Coastal Prairies ecoregion is drier than Ecoregion 34a to the north, not only receiving less annual precipitation, but also typically experiencing marsh complex supports marine life, supplies wintering grounds for ducks and geese, and provides habitat for small mammals and American alligators. Brown shrimp, the most summer drought. Annual precipitation ranges from 26 inches in the southwest to 37 inches in the commercially important marine species in Texas, is common along the whole coast, but in this northeast, with May and September peaks. Soils are hyperthermic compared to thermic in most northern coastal zone white shrimp are also commercially important. Eastern oysters and blue of Ecoregion 34a. Little bluestem, yellow Indiangrass, and tall dropseed were once dominant crabs are also common and commercially important in the region. Sport fishery species such as grasses. Eragrostoid grasses, including the genera Bouteloua, Buchloe, Eragrostis, Hilaria, and red drum, southern flounder, and spotted seatrout occur throughout the coastal bays in the agricultural areas of Ecoregions 34a and

semiarid climate of Ecoregion 34i to the south. Annual precipitation within Ecoregion 34h increases to the northeast, ranging from 34 to 46 inches. The region encompasses primarily has all three commercially important species of shrimp as well as important oyster and blue crab fisheries. Convergence of longshore currents from north and south occurs south of the Corpus Christi area near Padre Island National Seashore. Corpus Christi Bay serves as the ecozone or boundary between two distinct estuarine ecosystems. Copano and Mesquite bays to the north are low to moderate-salinity bays and attract whooping cranes and other birdlife. To the south in 34i, hypersaline Laguna Madre forms a unique ecosystem and supports greater expanses of seagrasses.

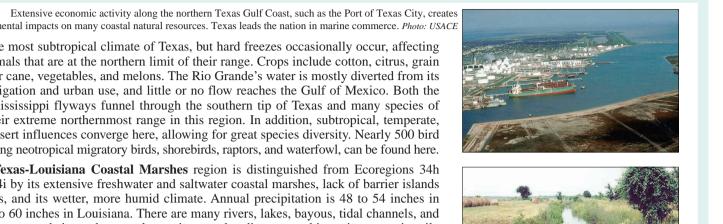
been moderately to heavily grazed, and large areas have been converted to non-native range or by its hypersaline lagoon system, vast seagrass meadows, wide tidal mud flats, large

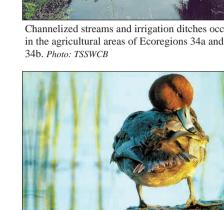
Coastal prairie, marsh, and tidal flats in the overwintering redhead duck population, numerous protected species, great fishery productivity, and a narrow barrier island with a number of washover fans. The lower coastal zone in Texas has a more semi-arid climate and has less precipitation (27-29 inches) compared to 34g and 34h. There is extreme variability in annual rainfall, and evapotranspiration is generally two to three times greater than precipitation. As no rivers drain into the Texas Laguna Madre, the lagoon water can be hypersaline. Combined with the Laguna Madre of Tamaulipas, it is the largest hypersaline system in the world. The shallow depth, clear water, and warm climate of this lagoon are conducive to seagrass production. Nearly 80% of all seagrass beds in Texas are now found in the Laguna Madre. The food web of the Laguna Madre is predominantly based on this submerged aquatic vegetation (seagrass and algae), rather than free-floating phytoplankton. Because of the hypersalinity, oysters are not commercially harvested to a large extent, although the region does contain the only strain of high-salinity adapted oysters in North America. The



A thick understory of yaupon and eastern redcedar occurs in some parts. Many areas of this the last glacial period. Other areas of loblolly pines appear within parts of 33b, but are mostly











juveniles are sometimes seen near stone jetties. and are believed to come from nesting beaches in Mexico. One hawksbill nest was found recently on Padre Island.

# 35. South Central Plains

In Texas, the **Floodplains and Low Terraces** of Ecoregion 35 comprise the western margin of the southern bottomland hardwood communities that extend along the Gulf and Atlantic coastal plains from Texas to Virginia. As delineated, 35b is mostly the Holocene regions to the east. In 35f, there is less beech and more swamp chestnut oak compared to alluvial floodplains and low terraces where there is a distinct vegetation change into bottomland Ecoregion 35e. Loblolly pine and laurel oak also occurred in mesic and other areas. This region oaks and gum forest. It does not include all of the higher terraces such as the older Deweyville is warmer, wetter, flatter, less dissected, and lower in elevation than 35a and 35e to the north, Formation terraces where vegetation tends to be more similar to the uplands, with some minor with a greater presettlement fire frequency. Streams are low gradient and sluggish. Almost all of swamp and wetland communities. Water oak, willow oak, sweetgum, blackgum, elm, red maple, the Big Thicket National Preserve is within this region. southern red oak, swamp chestnut oak, and loblolly pine are typical. Baldcypress and water

The Red River Bottomlands contain the floodplain and low terraces of the Red River tupelo occur in semipermanently flooded areas. Soils can include Inceptisols, Vertisols, and Entisols and are generally somewhat poorly drained to very poorly drained, clayey and loamy. The **Pleistocene Fluvial Terraces** ecoregion covers significant terrace deposits on Red River deposition is of variable texture and permeability. The lithology contrasts with the major streams in Louisiana and Arkansas, but terraces are less extensive in Texas,

Pleistocene terrace deposits of Ecoregion 35c, and the Tertiary sediments of Ecoregion 35a. occurring mostly along the Red River. Some smaller terraces occur along the Sulphur River but Natural vegetation of the bottomland hardwood forests included trees such as water oak, are not mapped at this scale. The broad flats and gently sloping stream terraces are lower and less sweetgum, willow oak, southern red oak, eastern redcedar, blackgum, blackjack oak, overcup dissected than 35a, but higher than the floodplains of 35b. Soils are typically Alfisols. In Texas, oak, river birch, red maple, green ash, and American elm. There are also some plant distribution current land cover is mostly pine-hardwood forest, with post oak, Shumard oak, and eastern differences between the floodplains of Ecoregion 35g and 35b. Currently in Ecoregion 35g, most redcedar woods to the west. In Arkansas, loblolly pine is more common on the terraces than natural woodland has been cleared for cropland and improved pasture, although some woodland shortleaf pine.

The Southern Tertiary Uplands ecoregion generally covers the remainder of longleaf pine range north of the Flatwoods (35f) on Tertiary sediments. Longleaf pine often occurred on sand ridges and uplands, but open forests were also found on other soil types and locations in 35e and 35f. On more mesic sites, some American beech or magnolia-beech-loblolly pine forests occurred. Some sandstone outcrops (Catahoula Formation) have distinctive barrens

Holocene deposits with saline, brackish, and freshwater marshes, barrier islands with minor Covering primarily the Holocene floodplain and low terrace deposits, the Floodplains washover fans, and tidal flat sands and clays. In the inland section from Matagorda Bay to and Low Terraces ecoregion, especially to the southwest, has a different bottomland Corpus Christi Bay, Pleistocene barrier island deposits occur. Typical soils on the coastal forest than the floodplains of Ecoregion 35. Bottomland forests of pecan, water oak, southern marshes are Entisols, with a minor extent of Histosols. Mollisols occur on tidal flats and coastal live oak, and elm, are typical, with some baldcypress on larger streams. The Brazos and marshes, and Entisols form in sandy barrier islands and dunes. Smooth cordgrass, marshhay Colorado River floodplains are a broad expanse of alluvial sediments, while floodplains to the cordgrass, and gulf saltgrass dominate in more saline zones. Other native vegetation is mainly south are more narrow. Soils include Vertisols, Mollisols, and Entisols. Large portions of grassland composed of seacoast bluestem, sea-oats, common reed, gulfdune paspalum, and The seagrass meadows of Ecoregion 34i are floodplain forest have been removed and land cover is now a mix of forest, cropland, and pasture. soilbind morning-glory. Some areas have clumps of sweetbay, redbay, and dwarf southern live oak important for North America's population of dune fields. Scarps can characterize bay margins due to beach erosion. Salt marsh and wind-tidal flats are mostly confined to the back side of the barrier islands with fresh or brackish marshes associated with river-mouth delta areas. Marshhay cordgrass becomes less important to the south in this region. Black mangrove begins to appear from Port O'Connor south. This area of the coast

The Laguna Madre Barrier Islands and Coastal Marshes ecoregion is distinguished

The rolling Tertiary Uplands, gently to moderately sloping, cover a large area in east southern sweetbay, hollies, wax-myrtles, insectivorous plants, orchids, and wild azalea; this Texas, southern Arkansas, and northern Louisiana. In East Texas, Tertiary deposits are vegetation becomes more extensive in the Flatwoods (35f). The region is more hilly and mostly Eocene sediments, with minor amounts of Paleocene and Cretaceous sediments in the dissected than the Flatwoods (35f) to the south, and soils are generally better drained over the north. Soils are mostly well-drained Ultisols and Alfisols, typically with sandy and loamy more permeable sediments. Currently, it has more pine forest than the oak-pine and pasture land surface textures. Natural vegetation includes loblolly pine, shortleaf pine, southern red oak, post cover to the north in 35a. Large parts of the region are public National Forest land. oak, white oak, hickory, and sweetgum, and mid and tall grasses such as yellow Indiangrass, pinehill bluestem, narrowleaf woodoats, and panicums. American beautyberry, sumac, greenbriar, and hawthorn are part of the understory. The sandier areas, mostly found on the Sparta, Queen City, and Carrizo Sand Formations, often have more bluejack oak, post oak, and
Sands to the north in 35e. Soils are less clayey than 34b to the south. This ecoregion once had a stunted pines. Pine density is less than in Ecoregions 35e and 35f to the south and in 35a to the east in Arkansas and Louisiana. Toward the western boundary, this region is slightly drier and has more pasture, oak-pine, and oak-hickory forest compared to other regions of Ecoregion 35. Many areas are replanted to loblolly pine for timber production, or are in improved pasture. Lumber and pulpwood production, livestock grazing, and poultry production are typical land uses. Oil and gas production is also widespread.

or glades in Texas and Louisiana. Seeps in sand hills support acid bog species including

Mostly flat to gently sloping, the **Flatwoods** ecoregion occurs on Pleistocene sediments in southeast Texas and southwest Louisiana. Soils on the sands in the Pleistocene Lissie Formation are generally more clayey, poorly drained and more acidic than on the Miocene Willis diversity of mixed pine-hardwood forest types with a mosaic of well-drained and poorly drained communities. The upland pine community was mostly longleaf pine along with sweetgum, white oak, southern red oak, willow oak, blackgum, and hollies. Poorly drained flat uplands had areas of pine savannas and small prairies with species-rich ground layers. Savanna wetlands on the Montgomery Formation and prairie areas on the Beaumont Formation were most likely larger in the Flatwoods than in 35e and 35a to the north. The beech-magnolia association, often cited as

within Ecoregion 35. The region includes the meandering channel of the Red River, oxbow lakes, meander scars, ridges, and backswamps. The Holocene alluvium associated with still occurs in very poorly drained and frequently flooded areas. The broad, nearly level bottomlands are often dominated by agriculture, with more cropland than other floodplains of Ecoregion 35. Soybeans, sorghum, wheat, and cotton are principal crops in Texas. The Red River carries high silt loads and is almost continuously turbid compared to other rivers of Ecoregion 35 The endangered red-cockaded woodpecker, one of eight woodpecker species in East Texa

Flounder, Southern

Seatrout, Spotted

Shrimp, Brown

Shrimp, Pink

Shrimp, White

**Terrestrial Animals** 

Bison, American

Bobwhite, Northern

Crane, Sandhill

Crane, Whooping

Deer, White-tailed

Dove, Mourning

Dove. White-winged

Chipmunk, Gray-footed

Aoudad (Barbary Sheep) Ammotragus lervid



Carolina ash, with baldcypress and water tupelo

Jackrabbit, Black-tailed Lepus californicus

Peccary Collared (Javelina) Pecari tajacu

Owl. Burrowing

Quail, Montezuma

Roadrunner, Greater

Squirrel, Eastern Fox

Toad, Houston

Squirrel, Eastern Gray

Turkey, Eastern Wild

Sheep, Desert Bighorn

Lizard, Checkered Whiptail Cnemidophorus tesselatus

Lizard, Round-tailed Horned Phrynosoma modestum

Prairie-Chicken, Lesser Tympanuchus pallidicinctus

Prairie Dog, Black-tailed Cynomys ludovicianus



Leopardus pardalis

Antilocapra americana americ

Cyrtonyx montezumae

Sciurus nige

Turkey, Rio Grande Wild Meleagris gallopavo intermedio

Sciurus carolinensis

Bufo houstonensis

Meleagris gallopavo

Canis lupus monstrabilis

Geococcvx californianus

Ovis canadensis mexicana

and Ovis canadensis nelson

Meleagris gallopavo silvestr

and Antilocapra americana mexican

Athene cunicularia

Herbaceous Plants (Forbs, Grasses, and Sedge Bluebonnet, Texas Lupinus texensis Bluestem, Big Andropogon gerardii Bothriochloa barbinodis Bluestem, Can Schizachyrium scoparium Bluestem, Silver Hedyotis nigricans

ordgrass, Smooth

Sporobolus cryptandrus Dropseed, Tall Sporobolus asper var. asper False Rhodesgras Trichloris crinita False Rhodesgrass, Multiflower Trichloris pluriflora Fern, Maidenhair Gamagrass, Easter Bouteloua spp. Bouteloua eriopodo Bouteloua gracilis Bouteloua breviseta Grama, Gyp Grama, Hairy Bouteloua hirsuta Grama, Sideoat Indiangrass, Yellow orghastrum nutans Eragrostis spp. Morning-glory, Soilbin Ipomoea pes-caprae Muhly, Bush Muhly, Gulf Muhly, Seep Needlegras Paspalum, Brownsee Paspalum, Fringeleaf Paspalum, Gulfdune Spartina alterniflora var. glabra Panicum

Saltgrass, Coastal Distichalis spicata var. spicata Cenchrus spp. Sandreed, Bi Carex meadi Leptochloa dubia Sprangletop, Gre Switchgrass Aristida spp. Threeawn, Purple Aristida purpure Vintergrass, Texas Tridens strictus Fridens, Long-spike Fridens, Lovegrass Tridens, White Woodoats, Narrowleaf Acacia spp. Acacia, Catclaw Acacia greggii

Shumard oak, sugar hackberry, elm, ash, eastern cottonwood, and pecan. Most of the prairie has of plant communities.

some calcareous clays and marls, but differ some from the Cretaceous-age formations of and Inceptisols.

Ecoregion 32a. Soils are mostly Vertisols (Calciusterts and Haplusterts), Mollisols (Calciustolls

Calamovilfa giganted Cladium mariscus Panicum virgatum Tridens eragrostoide Tridens albescens Chasmathium sessiliflorun

Sporobolus wrightii

Blackbrush Acacia rigidula Cactus, Strawberry Hedgehog Echinocereus stramineus Leucophyllum spp. Leucophyllum frutescen Opuntia imbricate Ceanothus greggi Karwinskia humboldtia Creosotebush Larrea tridentata Elbowbush Forestiera pubescen Ephedra spp. Smilax spp. Acacia berlandie Guayacan Guaicum angustifoliu Hawthorn Crataegus spp. Lechuguilla Agave lechuguille Zizyphus obtusifoli Mimosa, Black Mimosa pigra Mimosa, Catclaw Mimosa aculeaticarpa Fouquieria splenden Sabal mexicana Pricklyash, Lime (Colima)

Nolia arenicola

Yaupon Ilex vomitoria Yucca spp. Yucca, Pale Yucca pallide Yucca, Soaptree Yucca elata Fraxinus spp Ash, Carolina Fraxinus caroliniana Ash, Green Ash, Mexican Ash. Texas Fraxinus texensis Ash, Velvet Fraxinus velutina Taxodium distichu Baldcypress Basswood, Carolina Beech, American Fagus grandifolia Birch, River Betula nigra Blackgum

Geology, scale 1:500,000.

Fraxinus pennsylvanica Fraxinus berlandieriana

Artemisia filifolia

Lycium berlandie.

Rhus aromatica var. flabel

Dasylirion spp.

Hickory, Black Hickory, Water Juniper, One-seede Juniper, Redberry Kidnevwood Madrone, Texas Mangrove, Black Maple, Bigtooth

Mesquite, Honey

Elm. American Ulmus americana Celtis laevigate Carya texana Carva aquatica uniperus ashe Juniperus monosperma Juniperus pinchotii Evsenhardtia texana Arbutus xalapensis Avicennia germinans

Cottonwood, Eastern Populus deltoides

Acer rubrum *Prosopis* spp.

Prosopis glandulosa

Pithecellobium flexicaul

Oak, Whiteleaf Oak. White Shin Oak. Willow

Oak, Blackjack Oak, Gray Oak. Havard Oak. Lacev Oak, Mohr (Shinne Dak, Plateau Live Oak, Shumard Oak, Southern Live Oak, Southern Red Oak, Swamp Chestnu Dak, Texas (Buckley Dak, Water Quercus nigra Oak, White

Paloverde, Texas

Quercus macrocarpa Quercus grisea Ouercus havardi Ouercus lacevi Duercus laurifoli uercus mohrian Quercus fusiform Ouercus stellata Quercus shumardii Ouercus virginiana Ouercus falcata ercus michaux Quercus vasevar Quercus alba

Ouercus hypoleucoid

Ouercus sinuata

Duercus phellos

Carya illinoensis

Diospyros texan

Parkinsonia texano

Pine, Longleaf Pine, Shortleaf Redbay Red Cedar, Eastern Saltcedar, French Sweetbay, Southern Sweetgum Sycamore, American Tupelo, Water Walnut, Little (Texas)

Pine, Mexican Pinyon

Pine. Southwestern White Pinus strobiform amarix gallica Magnolia virginiana Liauidambar stvraciflu Plantanus americanus Tallow Tree, Chinese Nyssa aquatica Juglans microcarpa Willow, Black Salix nigra

Pinus ponderosa

Pinus palustris

Pinus echinata

**Aquatic and Marine Animals** Alligator, American Callinectes sapidus Drum, Black

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Duck, Redhead Turkey, Wild Avthva americana Warbler, Golden-cheeked Dendroica chrysoparia Ferret, Black-footed Flycatcher, Scissor-tailed Tyrannus forficatus Woodpecker, Red-cockaded Picoides borealis

open, mature pine forests. Their numbers have declined as the forests in Ecoregion 35

Paralichthys lethostigma

Cynoscion nebulosus

Penaeus aztecus

Penaeus duorarum

Penaeus setiferus

Ursus americanus

Colinus virginianu

Bison bison

Canis latrans

Grus americana

Odocoileus hemionus

Odocoileus virginianu

Zenaida macroura

Zenaida asiatica

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changed due to fire suppression, pine plantation management, and encroachment of ha

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Schizachvrium scoparium var. divergens Andropogon gerardii var. paucipilus Schizoparium scoparium var. littorale Grama Bothriochloa laguroides ssp. torreyana Grama, Black Andropogon spp., Bothriochloa spp., and Grama, Blue Buchloe dactyloide Scirpus spp. Typha spp. Clematis spp Dalea spp. Clover, Prairie Coneflower, Pale Purple Echinacea pallida

Spartina spartina

Spartina patens

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ripsacum didactylus Bouteloua curtipendu Muhlenbergia porteri Muhlenbergia capillaris Muhlenbergia reverchoni Paspalum citialifolium

Paspalum monstachyum

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